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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/519,451	09/29/2005	Tatsuo Nishita	033082R235	9723

441 7590 01/19/2007  
SMITH, GAMBRELL & RUSSELL  
1850 M STREET, N.W., SUITE 800  
WASHINGTON, DC 20036

EXAMINER
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AHMADI, MOHSEN

ART UNIT	PAPER NUMBER
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2812

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/19/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

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**Office Action Summary**

Application No.

10/519,451

Applicant(s)

NISHITA ET AL.

Examiner

Mohsen Ahmadi

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on 07 November 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3 and 5-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12/29/2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                      |                                                                   |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____                                                          | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

Applicants' response of 11/07/2006 has been entered in the record and considered. With respect to the rejection claims 35 USC 102 is withdrawn in view of applicants' amendments. The following new rejection is made under 35 USC 103 over claims 1-3 and 5-10. Claims 1-3 and 5-10 are under consideration. Claim 4 has been cancel. Claims 1-3 and 5-10 are rejected.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1-3, 5-6 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shoichi et al. (EP Pat # 1 152 461) in view of (JP 2002-176052 A dated 06/21/2002) in view of (WO 00-24049 dated 04/27/2000 A1) and further in view of (JP 2001-274154,A).**

**Regarding claim 1**, Shoichi et al. discloses a method for oxidation of a surface of an object to be process in a single processing container which can contain a plurality of objects to be processed, method characterized by performing oxidation wherein an active hydroxyl species and active oxygen species are mainly used in a vacuum atmosphere, a processing pressure is determined to be 133 Pa or below, and a

Art Unit: 2812

Processing temperature is determined to be 400 degree C or above (See page. 3 paragraphs [0013-0022-24]). Shoichi et al. discloses all of the claimed features as stated above except for the nitride film and silicon being both exposed on surface of object to be processed.

Documents (JP 2002-176052 A dated 06/21/2002), (WO 00-24049 dated 04/27/2000 A1) and (JP 2001-274154,A) respectively describe a method for oxidizing the surface using a hydroxyl group active species and an oxygen active species in vacuum atmosphere. Therefore, a person skilled in the art could have easily conceived of employing a work with nitride film and silicon exposed on the surface described in document (WO 00-24049 dated 04/27/2000 A1) and (JP 2001-274154,A) as the work described in Shoichi et al. .

**Regarding claim 2**, Shoichi et al. discloses a method for oxidation of an object to be processed, characterized by feeding an oxidizing gas and a reducing gas into processing container respectively by separate gas supply systems in order to produce active oxygen species and active hydroxyl species (See page. 3 paragraphs [0014-0015]).

**Regarding claim 3**, Shoichi et al. discloses a method for oxidation of an object to be processed, characterized in that: oxidizing gas includes one or more gases selected from the group consisting of O<sub>2</sub>, N<sub>2</sub>O, NO, reducing gas is H<sub>2</sub>, and H<sub>2</sub>

Art Unit: 2812

concentration inside processing container is 40% or below (see pages. 3 and 7 paragraphs [0020 and 0064]).

**Regarding claim 5**, Shoichi et al. discloses a method for oxidation of an object to be processed, characterized in that H<sub>2</sub> concentration is within the range from 5 to 33% (See page. 7 paragraph [0070]).

**Regarding claim 6**, Shoichi et al. discloses a method for oxidation of an object to be processed, characterized in that processing temperature is within the range from 800 to 1,000 degree C (See page. 3 paragraph [0024]).

**Regarding claim 9**, Shoichi et al. discloses a method for oxidation of an object to be processed, characterized by feeding an oxidizing gas and a reducing gas into processing container respectively by separate gas feed locations, (See page. 3 paragraphs [0014-0015]) and wherein a distance between a wafer-accommodating region in the processing container and each of said gas feed locations is 100 mm or more (see cols. 7-8, paragraphs [0046-0048]).

**Claims 7-8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shoichi et al. (EP Pat # 1 152 461) in view of Miner et al. (US Pat # 6,114,258).**

**Regarding claim 7**, Shoichi et al. discloses all of the claimed features as stated above except for a method of oxidation an object to be processed, characterized in that, prior to an oxidation processing, nitride film is formed to have an extra thickness corresponding to a thickness of the surface of nitride film to be oxidized.

Miner et al. discloses a method of oxidizing a substrate in the presence of nitride and oxynitride films.

Miner et al. discloses a method of oxidation an object to be processed, characterized in that, prior to an oxidation processing, nitride film is formed (See col. 4 lines 27-30).

However, Miner et al. did not disclose an extra thickness corresponding to a thickness of the surface of nitride film to be oxidized.

**Regarding claim 8**, Shoichi et al. discloses all of the claimed features as stated above except for a method of oxidation an object to be processed, characterized in that, nitride film is a silicon nitride film (SiN).

Miner et al. discloses a method of oxidation an object to be processed, characterizing where the nitride film is a silicon nitride film (SiN) (See col. 4, lines 34-36).

**Regarding claim 10**, Shoichi et al. discloses a method for oxidation of an object to be processed, wherein oxidation forms SiO<sub>2</sub> (col. 10, paragraph [0060]).

Shoichi et al. discloses all of the claimed features as stated above except for forming SiO<sub>2</sub> on the nitride film of the object.

Art Unit: 2812

Miner et al. discloses a method of oxidizing a substrate in the presence of nitride and oxynitride films.

Miner et al. disclose a method for oxidation of an object to be processed, and wherein the SiO<sub>2</sub> is formed on nitride film of the object (See col. 4 lines 48-63).

It would have been obvious to one of ordinary skill in the art, at the time of invention, to use the nitride film as disclosed by Miner et al. in the process of Shoichi et al. for its known benefit of forming SiO<sub>2</sub>.

### ***Response to Arguments***

Applicant's arguments filed 11/07/2006 have been fully considered but they are not persuasive. The prior art of record shows the method as described in the previous paragraphs.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

Art Unit: 2812


shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mohsen Ahmadi whose telephone number is 1-571-272-5062. The examiner can normally be reached on Mon-Fri 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebentritt can be reached on 1-571-272-1873. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MA  
01/05/2007

  
MICHAEL LEBENTRITT  
SUPERVISOR, PATENT EXAMINER